

Figure 1a is a schematic diagram of a joint comprised of two cones rolling on each other in a dimeric joint chain;

Figure 2 is a schematic diagram of a joint comprised of two cylinders arranged in an overlaid dimeric joint chain;

Figure 2a is a schematic diagram of a joint comprised of two cones rolling one inside the other in an overlaid dimeric joint chain;

Figure 3 is a diagram showing the generation of control faces in the joint arrangement of Figure 2;

Figure 4 shows the control face F1 produced by the sum of the contact lines B in a resting system;

Figure 5 shows the control face F2 produced by the sum of the contact lines B in a moving system;

Figure 6 is a diagram illustrating the construction required for production of articulating partial faces according to the invention;

*A1*  
*Cont*  
Figure 7 is an illustration of an articulating toric surface generated by a curved extension of the contact line B in the moved system;

Figure 8 is an illustration of an articulating toric surface generated by a curved extension of the contact line B in the unmoved system;

Figure 9 shows the articulation surfaces of a joint head of an artificial joint incorporating the control surface F1 of the unmoved system with the connected toric surface 10 according to Figure 8;

Figure 10 shows the femoral articulation surfaces of a joint head of an artificial joint incorporating the two control surfaces F1 of the unmoved system with connected toric surfaces

10 according to Figure 8 on opposite sides of a mid-plane X-X;  
and

*A1*  
*Cancel*  
Figure 11 shows the tibial articulation surfaces of a joint head of an artificial joint incorporating the two control surfaces F2 of the moved system with connected toric surfaces 9 according to Figure 7 on opposite sides of a mid-plane X-X. --;

✓ line 21, change the plus symbol "+" to a minus symbol "-";

✓ line 22, change "2" to -- 3 --.

✓ Page 5, line 13, change "picture" to -- Figure --;

line 14, change "F2" (second occurrence) to -- L2

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✓ line 15, change "picture" to -- Figure --.

✓ Page 6, line 13, change "picture" to -- Figure --.

In the claims:

Please cancel claims 1 through 3, inclusive, without prejudice or disclaimer, and substitute therefor the following new claims 4 through 8:

*A2*  
4. / An artificial joint for use as an endoprosthesis for replacing a natural joint, said artificial joint comprising at least two artificial joint members each having curved articulation faces;

wherein said joint is a flat or spherical four joint comprising first and second sides on opposite sides of a mid-plane;

wherein on each side of the joint a curved contact boundary is formed on each of the articulation faces; the curved contact boundary on one of the articulation faces being part of an elliptical section contour of a first cylinder or cone representing a fixed joint member, and the curved contact boundary on the other of said articulation faces having the form of a counter track of a second cylinder or cone representing a moved joint member which rolls or slides on the first cylinder or cone;

each side of said joint having a fixed or moving holoid lying in a reference plane or sphere, said reference plane or sphere being selected such that it lies between the condyles to be constructed;

wherein a straight contact line along which the fixed and moved members touch at any given instant is drawn from a respective contact point lying on the curved contact boundaries either

*A<sub>2</sub>*  
*Condyl*  
to a point which is fixed relative to the fixed or moved member and which lies in a randomly selected sagittal plane shifted toward the interior of the joint, or

to the instantaneous center of revolution on the fixed or moving holoid; and

wherein the sum of the straight contact lines forms a first contact face on the fixed member and a second contact face on the moved member, said first and second contact faces each representing a joint face of one of the two sides of the four-joint.

*2*  
*11*  
8. An artificial joint according to claim 1, wherein the curved contact boundary on one of the articulation faces is part

of an elliptical section contour of a first cylinder having a radius  $R_1$  and the curved contact boundary on the other of said articulation faces is a counter track of a second cylinder having a radius  $R_2$ , and wherein the first and second cylinders are arranged with respect to each other such that they form a stretched dimeric link chain having an axial path radius  $R$  which satisfies the relationship  $R = R_2 + R_1$  or an overlapped dimeric link chain having an axial path radius  $R$  which satisfies the relationship  $R = R_2 - R_1$ .

*3*  
~~6.~~ An artificial joint according to claim ~~4~~, wherein the curved contact boundary on one of the articulation faces is part of an elliptical section contour of a first cone having a cone angle  $\alpha_1$ , the curved contact boundary on the other of said articulation faces is a counter track of a second cone having a cone angle  $\alpha_2$ , and wherein the first and second cones are arranged with respect to each other such that they form a stretched dimeric link chain having an angle  $\alpha$  which satisfies the relationship  $\alpha = \alpha_2 + \alpha_1$  or an overlapped dimeric link chain having an angle  $\alpha$  which satisfies the relationship  $\alpha = \alpha_2 - \alpha_1$ .

*4*  
~~7.~~ An artificial joint according to claim ~~4~~, wherein the straight contact lines have curved extensions on the side of the curved contact boundaries opposite the contact faces such that toric surfaces are formed; said curved extensions lying in a plane defined by the respective straight contact line and a line perpendicular to a tangent ( $t$ ) of the curved contact boundary at the respective contact point, and wherein the toric surfaces are formed such that outer portions of the articulation faces of the toric surfaces have no contact with each other.

3  
8. An artificial joint according to claim 4, wherein said joint comprises an overlapped dimeric link chain forming a medial joint compartment of an artificial joint for a human knee, and a stretched dimeric link chain forming a lateral joint compartment of said artificial joint, and wherein the respective joint compartments comprise femur-side joint parts and tibia-side joint parts which are rigidly connected with respect to each other.

As  
concl

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